

# Misidentification of specimens of *Eurysolen gracilis* Prain with *Pogostemon wattii* C.B. Clarke

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## Abstract

The herbarium materials belonging to *Pogostemon wattii* C.B. Clarke and *Eurysolen gracilis* Prain at E, K & CAL were examined. It has been found that a large number of specimens of *E. gracilis* are incorrectly identified as *P. wattii*. The present paper highlights the problems of identification and indicates the key characters which can be employed for correct identification.

## INTRODUCTION

*P. wattii* was described by C.B. Clarke in 1889 based on specimens from Kohima, Naga Hills (alt. 4750 ft.) (Fig. 1). Bhatti (1995) placed *P. wattii* under subsection Basiglabrous of the section *Pogostemon* having glabrous staminal bases. Prain (1890-91) included *P. wattii* under "some additional species of Labiatae" with a remark that this species is very distinct and cited specimens 5079 and 6613 from Assam, and "4750" (the holotype) from Naga Hills, Kohima. The number, he cited for the last specimen is actually an error; it is the altitude of the locality from where the specimen was collected and mistaken for collection number.

The first two specimens he cited and on which he based his account of *P. wattii* are infact specimens of *Eurysolen gracilis* Prain. From this it is doubtful whether he saw the holotype of *Pogostemon wattii* or not. The holotype is very different. Prain's account of the taxon has resulted in the misidentification of many specimens of *E. gracilis* as *P. wattii*. In Calcutta herbarium (CAL) there is a drawing of *E. gracilis* named as *P. wattii* (Fig. 2).

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Fig.1. Holotype of *Pogostemon wattii* C.B. Clarke

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It is worth noting that Mukerjee (1940) in "Labiatae of the Indian Empire" mentioned some of the characters of *E. gracilis* while describing *P. wattii*, which in turn added further confusion.

Prain (1898) described a new monotypic genus viz. *Eurysolen* from Kachin hills, Burma. He was not certain of its position in higher categories, viz. tribe, subfamily etc. and placed it among the Prasieae near *Gomphostemma* Wall. ex Benth. on the basis of having a one-celled anther. He sent a plant specimen along with its description to Briquet in Geneva who suggested that *Eurysolen* might be placed in the Prasieae or Ajugoideae. The lack of mature fruits precluded Briquet from assigning its position in a higher category. Other authors changed its position from one group to another group. Kudo (1929) placed it in the Prasieae. Mukerjee (1940) placed it under Ajugoideae. Wu (1959) agreed with Mukerjee but, in addition, he pointed apparent relationship of *Eurysolen* with *Pogostemon*. Chermersirivathana (1963), after examining mature fruits, placed *Eurysolen* with *Pogostemon* under the Stachyoideae. Keng (1969, 1978) and Press (1982), supported Chermersirivathana's view point. In a principal co-ordinates analysis and a kind of cluster analysis done by Press (1982), *Eurysolen* was found to be associated with *Elsholtzia* section *Aphanochilus* Benth. sensu stricto. Press's (1982) single-linkage analysis placed it between *Rostrinucula* Kudo and *Tetradenia* Benth. Press (1982) included *Eurysolen* in the tribe Pogostemoneae on the basis of having unilocular anther, and a binucleate-tricolpate pollen. In addition, he mentioned that it shares the characters of an invagination of the corolla, hairy bosses at the base of the staminal filaments with that of *Rostrinucula*. Cantino et al. (1992) hesitantly placed *Eurysolen* in the subfamily Pogostemonoideae. Abu-Asab and Cantino (1994) suggested that *Eurysolen* has affinities with *Achyrosperrum* Blume, *Comanthosphace* S. Moore and *Ajuga* L. in the nature of sculpturing of the pollen.

**DISCUSSION**

***Eurysolen gracilis*** Prain, Sci. Mem. Off. Med. Dept. Govt. India 11:43. 1898.

Stem terete, solid, puberulous; hairs simple, uniseriate up to 4-celled, ca. 475 µm long, basal cell translucent, lineate structure under light microscope. Leaves unequal ovate-rhomboid in shape, 80 x 56 mm in size, base long cuneate, apex acuminate, margin dentate, lower part entire, puberulent on both surfaces of lamina; veins densely hairy beneath, hairs simple, uniseriate, 3-celled, ca. 625 µm long, basal cell ornamented by lines (under microscope). Petiole up to 35 mm long, hairs similar in size and shape as that of stem. Inflorescence a spike, ca. 50 mm long; flowers in whorls closely arranged on spike; hairs 3-celled, ca. 437 µm long. Calyx campanulate, ca. 3.5 x 4 mm in size; teeth ciliate on margin, longest tooth ca. 0.5 mm, shortest tooth ca. 0.3 mm long, width of widest tooth ca. 1 mm, narrowest tooth ca. 0.8 mm, wide at base; outside puberulent, hairs glandular and eglandular, 3-celled, ca. 500 µm in length, basal cell with spiral ornamentation above. Corolla up to 7 mm long; lower lip ca. 1.8 x 1 mm in size; all filaments inserted under the upper lip at a level of ca. 5 mm. from the base in the tube; two outer filaments ca. 3 mm long, inner two ca. 2.5 mm long, exerted part of filaments ca. 1 mm; filaments with simple uniseriate terete hairs at the middle portion. Disc ca. 0.5 mm long, ovary lobes covered by ball like glands. Style ca. 6.6 mm long; stigma lobes ca. 0.2 mm long. Nutlets ca. 100 x 700 µm in size.

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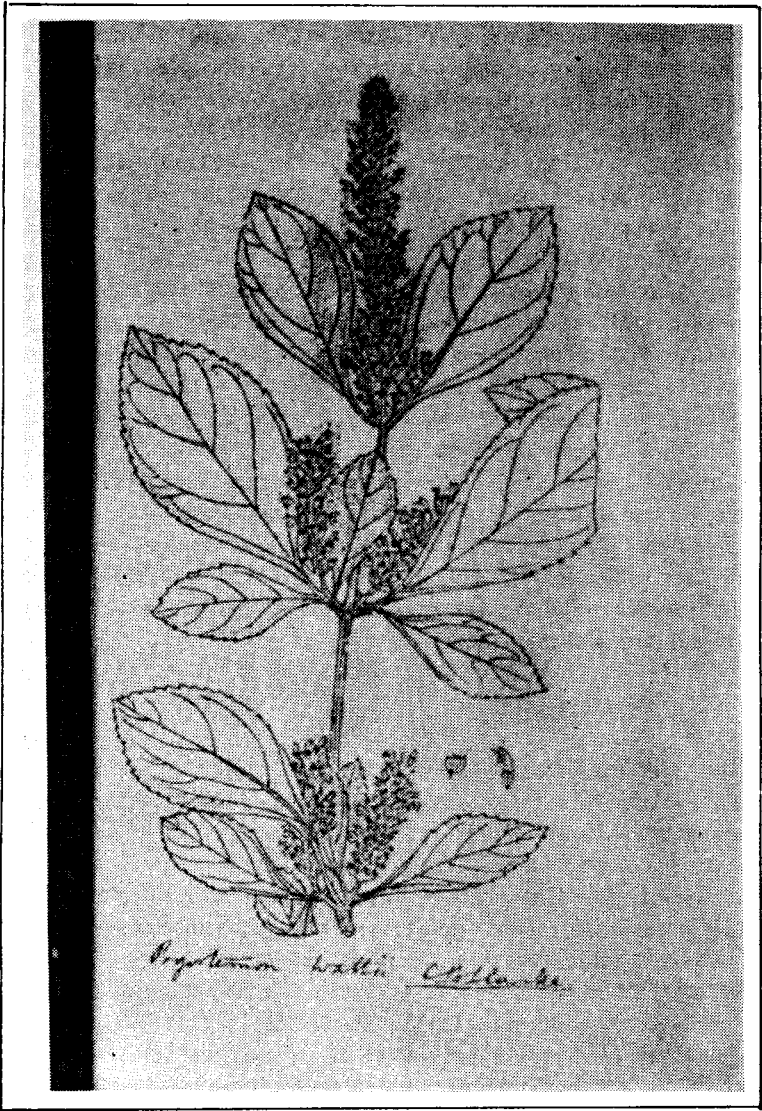


Fig.2. Drawing of *Eurysolen gracilis* named as *Pogostemon wattii* - "Isotype" available at CAL

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***Pogostemon wattii*** C.B. Clarke, Jour. Linn. Soc. 25: 59. 1889.

Stem solid, terete, puberulent; hairs 5-celled, ca. 800  $\mu$ m long. Leaves ovate, ca. 75 x 45 cm in size, puberulent, truncate at base, apex acute, margin dentate; hairs 5-celled, ca. 800  $\mu$ m long. Petiole ca. 2 cm long; hairs 5-celled, ca. 800  $\mu$ m long. Inflorescence terminal spike accompanied by lateral two or more spikes, ca. 7 cm long, dense; hairs 8-celled, ca. 1000  $\mu$ m long. Calyx infundibular, ca. 3 x 3.5 mm, 5-veined inside, teeth and upper part of the tube hairy within, teeth ciliate, ca. 0.8-1 mm long, width at base ca. 0.5-0.7 mm; outer hairs 3-celled, ca. 350  $\mu$ m long. Corolla up to 4 mm long; lower lip 1 x 1 mm in size; upper lip ca. 1.8 mm across; central lobe ca. 0.8 x 0.6 mm at base. All filaments inserted at a level of ca. 1.7 mm from the base of the tube; filaments ca. 3.5-4 mm long; exerted part ca. 0.5 mm long; glabrous at the basal parts; filaments with moniliform hairs at the middle portion. Disc ca. 0.4 mm long. Style 5.5 mm long; stigma lobes ca. 0.5 mm in size. Nutlets 4; ca. 430 x 360  $\mu$ m, ovate in shape surface reticulate-foveate.

**FLORAL MORPHOLOGY**

The general appearance of *Eurysolen gracilis* has brought it closer to the section *Pogostemon*, although, its corolla lobes and shape are completely different (Fig. 3).

A row of trichomes, broad and more or less triangular in shape, occurs at the base the staminal filaments (Fig. 4. A & B). Each trichome is unicellular. This structure has been regarded as an annulus of hairs at the end of corolla tube by earlier researchers (Mukerjee, 1940; Keng, 1978; Press, 1982). However, these hairs are not arranged to form a ring of hairs but are attached only at four protruberent base of the filaments. This protruberent base of each filament is slightly dissociated from the corolla tube. A gap between filaments where style passes through, is glabrous.

It is difficult to decide which is the upper and lower corolla lip in *E. gracilis*. Keng (1969) in his treatment of Malaysian Labiatae, followed the drawings made by A.D. Molla and treated the three-lobed lip as the lower lip, and the lobe where the filaments are attached as the upper lip. The latter is short, erect and has a retuse tip. He has also illustrated it in the same fashion. In contrast, Press (1982) clearly depicted the upper lip and two lateral lobes of the lower lip recognised by Keng, as forming the upper lip of the corolla. The central lobe of the lower lip is regarded as the lower lip of the corolla.

By dissecting the flowers of *E. gracilis* the shape of corolla can be obtained. It is impossible to see the orientation on the inflorescence. The corolla tube of the dissected flower show a gibbous part with a sac-like organ having an open mouth. This part is more likely to be used in storing the nectar released by nectaries which are present at the base of the filaments.

Earlier researchers reported an annulus of hair at the base of the filaments. Infact, the lower lip of the mouth of the sac is decorated by trichomes like those at the base of the filaments which are probably nectaries. The continuity of nectaries from the filament base and the position of the

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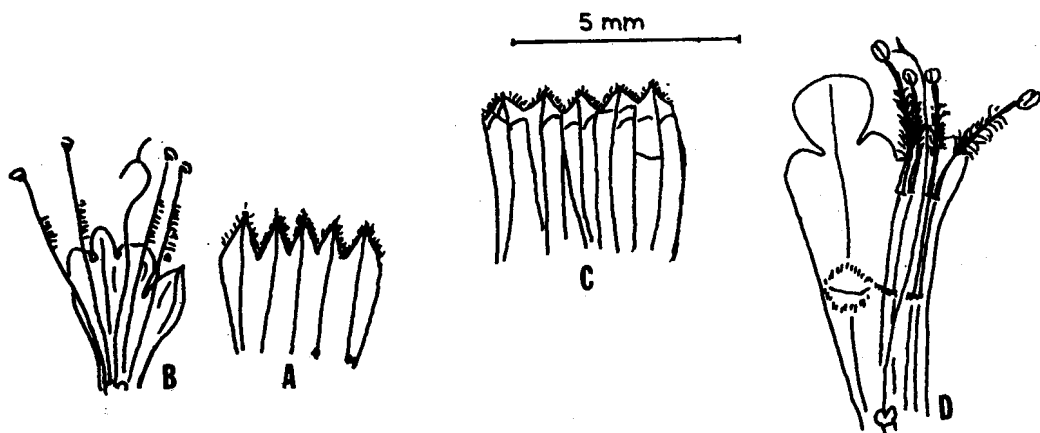


Fig.3. Dissected flowers. A & B. *Pogostemon wattii*: A. Calyx tube split open; B. Corolla split open; C & D. *Eurysolen gracilis*: C. Calyx tube split open; D. Corolla split open.

gibbous sac suggest that Keng's interpretation of corolla shape is correct. The sac-like organ, in its normal position in the corolla, covers the basal protruberent part of the filaments.

The SEM study of hairs present on the middle of the filaments shows that they are simple, uniseriate and unicellular (Fig.5, A), whereas in *Pogostemon*, hairs are moniliform (Fig. 5,B).

In *Eurysolen* there are four dry dark brown, oblong nutlets (Fig. 6,A). Their inner surface is completely covered by golden coloured glands. The SEM study of the glands revealed that they are spherical and smooth surfaced. No members of *Pogostemon* have this type of glands on the nutlet surface. Nutlets in *P. wattii* are ovate with reticulate-foveate surface (Fig. 6,B).

*P. wattii* has pogostemoniac corolla (Fig. 3). In this type of the corolla, the tube is terminated by two lips. The upper lip is divided into three lobes. The central lobe is slightly longer than the two lateral lobes. The lower lip is single lobed and narrowly triangular in shape. The sinus between the lobes of upper and lower lips corresponds to the attachment point of the filaments.

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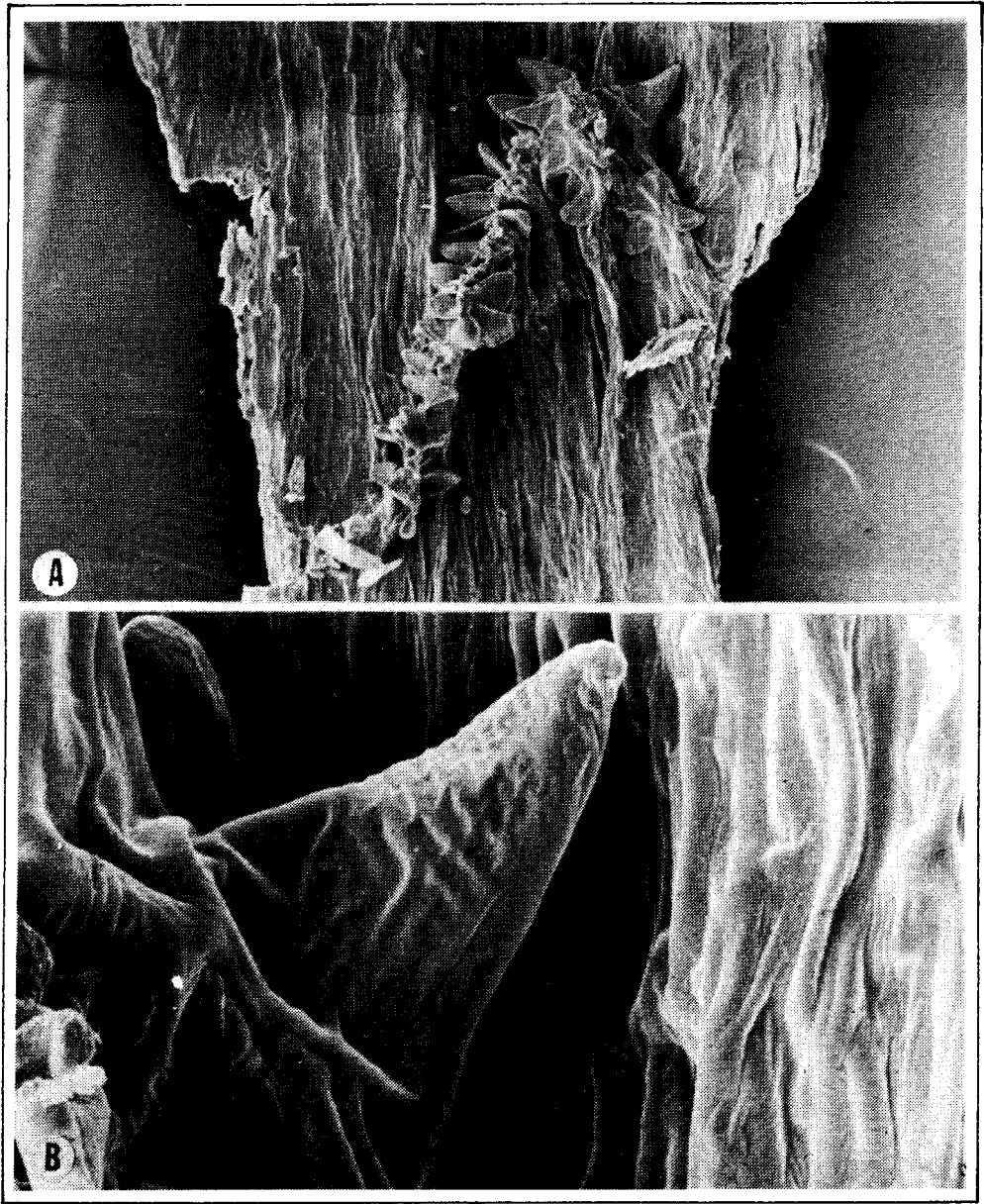


Fig.4. *Eurysolen gracilis* - Scanning Electron Micrographs of trichomes. A. Trichomes at the base of staminal filaments (x 260); B. Single trichome enlarged (x 1800).

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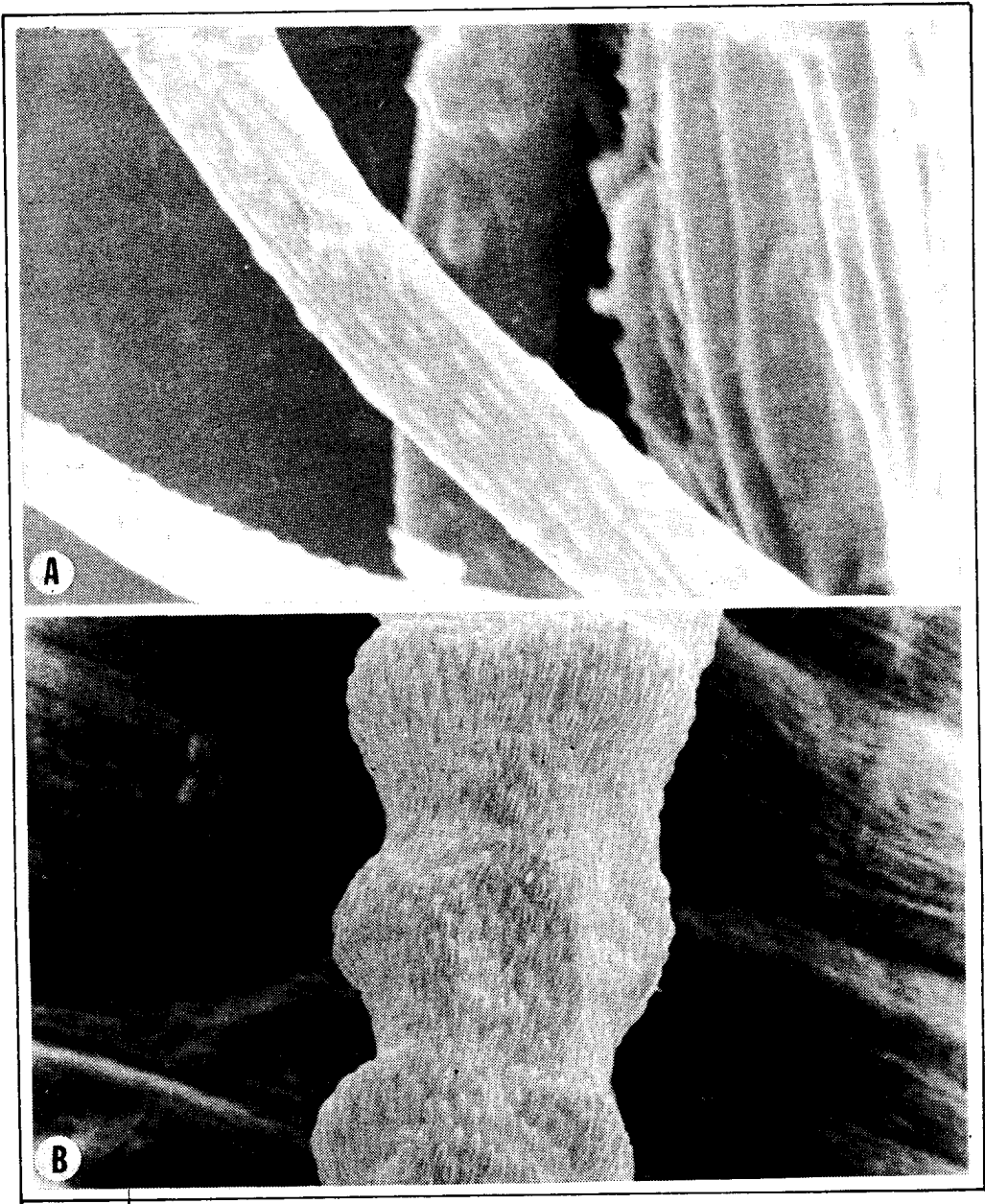


Fig.5. Scanning Electron Micrographs of staminal hairs. A. Portion of a staminal hair of *Eurysolen* (x 2000); B. A portion of staminal hair of *Pogostemon* (x 2000).



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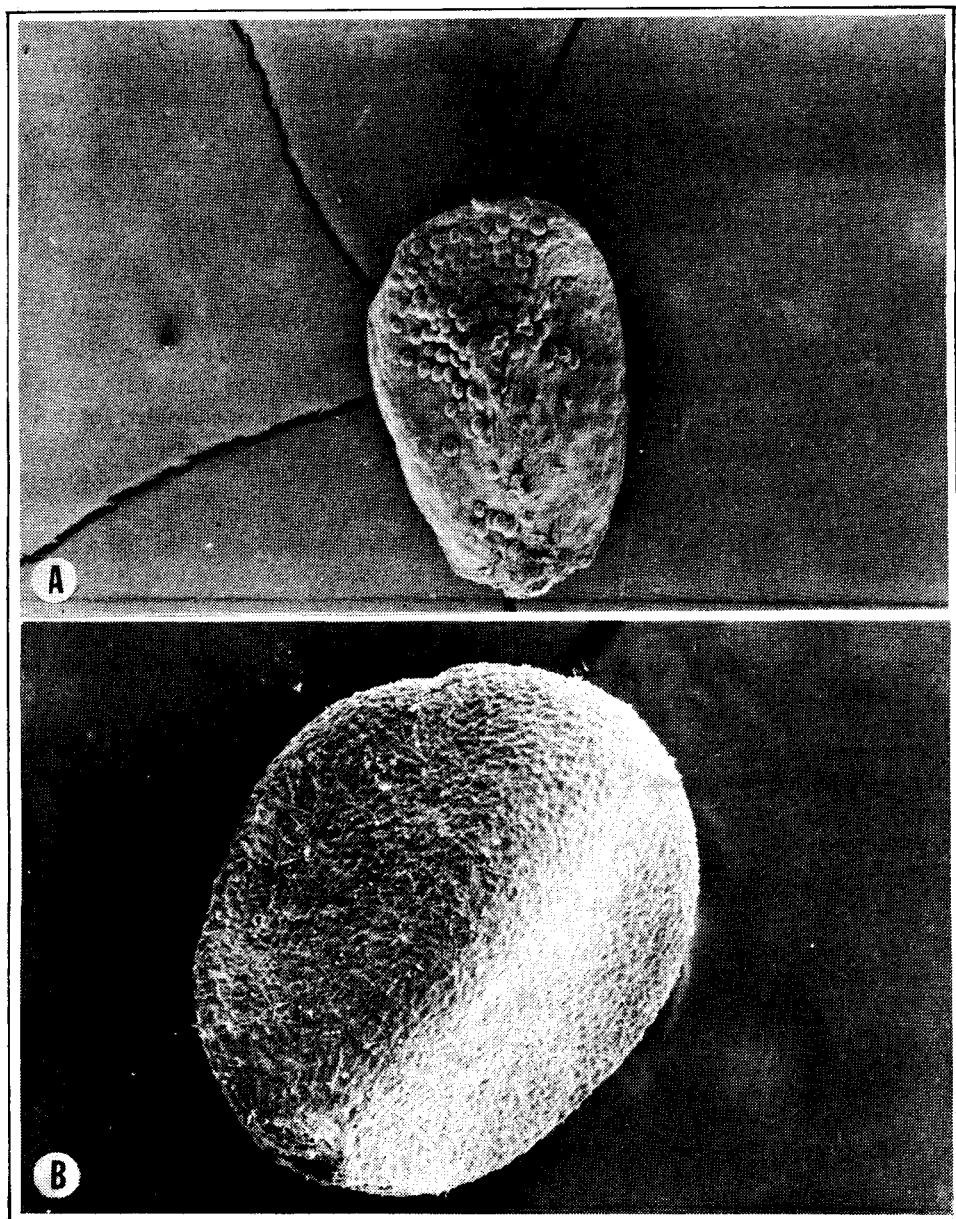


Fig.6. Scanning Electron Micrographs of nutlet. A. Nutlet of *Eurysolen gracilis* (x 78); B. Nutlet of *Pogostemon wattii* (x 160).

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## CONCLUSION

The duplicates of the specimen no. 5079 available at National Herbarium, Calcutta, India (CAL), and Royal Botanic Garden, Edinburgh (E) have been treated as isotypes of *Pogostemon wattii*. The present investigation confirms their identity as *Eurysolen gracilis*. Therefore, the "isotypes" of *P. wattii* available at CAL and E should be considered as *E. gracilis*. Besides, the specimens Chand 4259 and 6718(E), Meebold 7175(E), Watt 5079 (CAL, E & K) and 6613 (CAL, E & K) which were identified as *P. wattii* should be treated as *Eurysolen gracilis*.

## Acknowledgements

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